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PATENT  
Docket No. H 3491 PCT/US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 09/701,751      Examiner: Eisa B. Elhilo  
Filed: February 8, 2001      Art Unit: 1751  
Customer No.: 000423      Confirm. No.: 7934  
Title: DETERGENT CONTAINING AMYLASE AND PERCARBONATE

APPEAL BRIEF TRANSMITTAL

Mail Stop Appeal Brief-Patents  
Commissioner for Patents  
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Alexandria, VA 22313-1450

Sir:

Appellant's brief, in triplicate, is transmitted herewith in accordance with 37 C.F.R. § 1.192.

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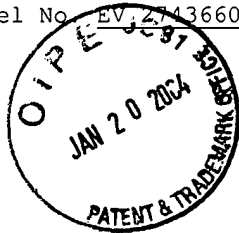
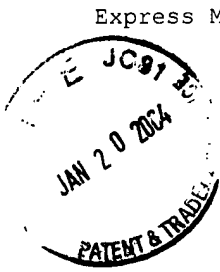
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Respectfully submitted,

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Enclosures

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Applicants appeal under 37 C.F.R. § 1.192(a) from the Final Office Action of May 20, 2003. A Notice of Appeal, payment of the appeal fee under 37 C.F.R. § 1.17(b), and a (3) Month Request for Extension of Time were filed on November 19, 2003.

I. Real Party In Interest

The real party in interest in this appeal is the assignee, Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA).

## II. Related Appeals and Interferences

There are no related appeals or interferences known to applicants, assignee, or their legal representatives that will affect or be affected by or that have a bearing on this appeal.

## III. Status of the Claims

The pending claims are 1, 12-18, 20 and 21, claims 2-11 and 19 having been canceled during prosecution. All of the pending claims 1, 12-18, 20, and 21 are under final rejection and are appealed. The pending claims appear in the Appendix to this Brief.

## IV. Status of Amendments

There have been no amendments filed subsequent to the final rejection from which this appeal is taken.

## V. Summary of Invention

The present invention is based on the discovery that combination of a certain naturally occurring  $\alpha$ -amylase with a certain peroxidic oxidizing agent unexpectedly leads to improved detergent performance. The invention involves the selection of a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens* from among the hundreds of  $\alpha$ -amylases of various natural and synthetic origins disclosed in the art. Claim 1; spec. at page 2, lines 21-31. Claims 12-18 recite features of the preferred embodiments of the

basic composition, such as concentrations of the basic components (claims 12-14), the selection and form of the peroxidic oxidizing agent (claims 16-18), and additional components (claim 15), all of which are described in the specification at page 3, line 20 to page 4, line 24 and at page 19, lines 6-13.

The invention also relates to a method of enhancing the cleaning performance of detergent solutions by adding to such solutions the claimed combination of enzyme and oxidizing agent, particularly in use against starchy soils or stains. (Claims 20, 21; spec. at page 2, line 33 to page 3, line 13).

#### VI. Issues

- A. Whether the subject matter of claims 1, 12-18, 20, and 21 is obvious over the disclosure of WO 98/07818 (Herbots)?

#### VII. Grouping of Claims

All claims stand or fall together in this appeal.

#### VIII. Argument

The present invention is based on the discovery that combining a certain naturally occurring  $\alpha$ -amylase with a certain peroxidic oxidizing agent unexpectedly leads to improved detergent performance. The invention requires the selection of a naturally occurring  $\alpha$ -amylase derived from

*Bacillus amyloliquefaciens* from among the hundreds of  $\alpha$ -amylases of various natural and synthetic origins disclosed in the art. Applicants contend in this appeal that the Examiner has failed to establish even *prima facie* obviousness of applicants' claims, and that even if the claims are *prima facie* obvious, they are not ultimately obvious in view of unexpected performance demonstrated in their application.

The applicable legal standards are clear. It is U.S.P.T.O. policy to follow the four factual inquiries of Graham V. John Deere Co., 148 U.S.P.Q. 459 (1966) in resolving issues of obviousness. M.P.E.P. § 2141. The scope and content of the prior art are not in dispute. Herbots discloses laundry detergent compositions comprising an amylase and an amylase-directed antibody. The amylases useful in Herbots' detergent compositions include both  $\alpha$ - and/or  $\beta$ - amylases. At page 11, lines 13-24, Herbots discloses that the enzymes can be of animal or plant origin, purified or non-purified, mutant or native. A native enzyme product derived from *B. amyloliquefaciens* is disclosed at page 12, line 11 (Ban®; Novo Nordisk A/S). Herbots' examples do not specify the exact enzyme used in the compositions tested. Herbots' claims call for an amylase of fungal or bacterial origin within the class EC 3.2.1.1, which encompasses literally hundreds of  $\alpha$ -amylases.

Neither does there appear to be a dispute over the differences between applicants' claims and the disclosure

of the reference. Applicants' claims very specifically call for a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens*. The reference does disclose an amylase such as applicants claim, among a far broader disclosure of any and all amylases of fungal or bacterial origin within the class EC 3.2.1.1, which encompasses literally hundreds of  $\alpha$ -amylases. As to the specific origin of amylases suitable for use within the scope of its teachings, Herbots is indifferent.

In making the factual inquiries set out in Graham v. John Deere, the examiner also must adhere to certain basic principles of patent law. M.P.E.P. § 2141. One of those is that the references in the prior art must be considered as a whole and must suggest the desirability of making the claimed combination of elements. This basic principle is also embedded in the Examiner's procedural burden to establish a *prima facie* case. M.P.E.P. § 2142. Thus a suggestion or motivation in Herbots to select the enzyme claimed by applicants is required to establish *prima facie* obviousness of their claims.

Most inventions are combinations, and mostly of old elements. "If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue." In re Rouffet, 47 U.S.P.Q. 1453, 1457 (Fed. Cir. 1998). Therefore P.T.O. must produce evidence from the art that would lead one of skill to select and combine the claimed elements.

Even if the art could be combined as claimed, and one of skill would be capable of doing it, there is no prima facie obviousness absent evidence of motivation. M.P.E.P. § 2143.01. Where a rejection is based on a single reference, "there must be a showing of a suggestion or motivation to modify the teachings of that reference." In re Kotzab, 55 U.S.P.Q. 2d 1313, 1316-17 (Fed. Cir. 2000). "[T]he examiner must show reasons that the skilled artisan, confronted with the same problems and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." Rouffet, 47 U.S.P.Q. 2d at 1458 (emphasis added).

To reach the invention from the disclosure of Herbots first requires selecting the claimed naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens* from among the hundreds of  $\alpha$ -amylases of various natural and synthetic origins disclosed in the reference. One of ordinary skill in the art would have had little reason from Herbots alone to make this selection and combination.

The amylases described as suitable for use in Herbots' detergent include both  $\alpha$ - and  $\beta$ - amylases. Herbots is indifferent to the origin of these amylases. At page 11, lines 13-24, Herbots discloses that the enzymes can be of animal or plant origin, purified or non-purified, mutant or native. No particular attention is drawn to the native enzyme produced by *B. amyloliquefaciens* disclosed at page 12, line 11, and Herbots reinforces this indifference by

not specifying the exact enzyme used in its examples. Nor do Herbots' claims lead one to any specific amylase, out of the hundreds disclosed. At their most specific, the claims call for any amylase of fungal or bacterial origin within the class EC 3.2.1.1, which encompasses literally hundreds of  $\alpha$ -amylases.

On the other hand, applicants very specifically call for a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens*. Even in its most preferred embodiments, Herbots does not distinguish between BAN<sup>®</sup> and the other  $\alpha$ -amylases not recited by applicants' claims. One of ordinary skill in the art would have found no guidance in Herbots to select this specific amylase from the myriad amylases disclosed to combine with the recited peroxidic oxidizing agent.

The Board of Appeals in Ex parte Wittpenn, 16 U.S.P.Q. 2d 1730 (Bd. Pat. App. & Int. 1990) reversed a rejection under very similar circumstances. The single prior art reference taught that its surfactant composition could include a nonionic surfactant that was required by the rejected claims, though no particular preference was expressed for that nonionic surfactant anywhere in the reference. The Board concluded that since no disclosure within the reference "would have led the routineer to make the critical selections to arrive at the claimed surfactant composition, we find that no prima facie case of obviousness has been established and that the rejection before us cannot be sustained." Id. at 1731. Because



Herbots is equally wanting in disclosing any preference for the claimed enzyme, rejection of the claims for obviousness over this reference should not be maintained.

The Examiner has stated that it would have been obvious "to select any of the species of the amylase genus taught by the reference, including  $\alpha$ -amylase of the claims, because an ordinary artisan would have the reasonable expectation that any of the species of the genus would have similar properties and thus, the same use as the genus as a whole." Whether one of skill would have expected the claimed enzyme to work is not germane where there was no motivation to select it in the first place. Moreover, the Examiner's statement about expectations is wholly unsupported by any evidence from the art. On the other hand, there are teachings in the art that would have led one of skill to conclude that combining  $\alpha$ -amylases with the recited peroxidic oxidizing agents would not have been successful.

EP 0 684 304 at page 2, lines 50-58 discloses that  $\alpha$ -amylases are particularly sensitive to bleaching agents, and that the results in any particular case are quite unpredictable. Similarly, EP 0 867 504 at page 2 discusses at length the known propensity of  $\alpha$ -amylases as a class to become inactivated in the presence of peroxidic and other oxidizing agents. Both references disclose specific genetic modifications to native enzymes to improve resistance to attack by oxidants.

Thus it is wholly unjustified for the Examiner to conclude that one of skill would expect any of the members of the vast genus of amylases disclosed by Herbots to be equally useful in the presence of an oxidant. In fact, one of skill would have concluded exactly the opposite, the presumption being that a native enzyme such as the claimed one would have been rendered unsuitable by the presence of an oxidant. Because the Examiner's unsupported presumption is belied by the actual teachings of the art, no *prima facie* obviousness of applicants' claims is established by Herbots.

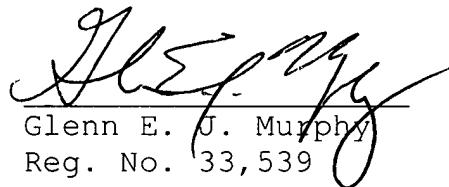
Moreover, any *prima facie* obviousness of the claims is overcome by the comparative testing presented in applicants' examples 1 and 2. Detergent compositions according to the invention comprising a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens* were compared to detergent compositions comprising several well-known amylases of natural and synthetic (genetically modified) origin. Indeed, applicants tested inventive compositions against compositions comprising some of the very enzymes that Herbots in its examples saw no reason to specify, including Termamyl® 60T, a naturally occurring amylase derived from *Bacillus lentus*, Duramyl® and PurafectOxAm®, genetically modified amylases, and Fungamyl®, an amylase of fungal origin. In applicants' tests, detergent compositions comprising the naturally occurring  $\alpha$ -amylase derived from *B. amyloliquefaciens* clearly outperformed otherwise identical detergent compositions containing these other  $\alpha$ -amylases. Thus, any

*prima facie* obviousness based on Herbots is rebutted by applicants' evidence of unexpected and superior cleaning performance according to the invention.

CONCLUSION

For the reasons stated above, the Examiner's final rejection of claims 1, 12-18, 20 and 21 should be reversed. Should any fees be due for entry and consideration of this Brief that have not been accounted for, the Commissioner is authorized to charge them to Deposit Account No. 01-1250.

Respectfully yours,

  
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Reg. No. 33,539  
Attorney for Applicant  
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Patent Law Department  
2200 Renaissance Blvd., Suite 200  
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APPENDIX

1. A detergent comprising
  - a) a naturally occurring  $\alpha$ -amylase from *Bacillus amyloliquefaciens*; and
  - b) at least one alkali metal percarbonate.
12. The detergent of claim 1, wherein the  $\alpha$ -amylase is present in an amount of from 0.001 to 0.5 mg per gram of the detergent.
13. The detergent of claim 1, wherein the at least one alkali metal carbonate is present in an amount of up to 50 percent by weight.
14. The detergent of claim 1, wherein the detergent contains 0.5 to 10 percent by weight of at least one compound which gives off peroxycarboxylic acid under perhydrolysis conditions.
15. The detergent of claim 1, wherein the detergent contains up to one percent by weight of at least one bleach boosting substance selected from group consisting of transition metal salts and transition metal complexes.
16. The detergent of claim 1, wherein the at least one alkali metal percarbonate comprises sodium percarbonate.

17. The detergent of claim 1, wherein the at least one alkali metal percarbonate is present in the form of granules.

18. The detergent of claim 1, wherein the at least one alkali metal percarbonate has a morphology index of below 0.06.

20. A method of increasing the cleaning performance of a detergent in washing and cleaning solutions, the method comprising the step of adding:

- a)  $\alpha$ -amylase from *Bacillus amyloliquefaciens*; and
  - b) at least one alkali metal percarbonate,
- to said detergent.

21. The method of claim 20, wherein the performance is increased against starchy and/or colored stains.



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basic composition, such as concentrations of the basic components (claims 12-14), the selection and form of the peroxidic oxidizing agent (claims 16-18), and additional components (claim 15), all of which are described in the specification at page 3, line 20 to page 4, line 24 and at page 19, lines 6-13.

The invention also relates to a method of enhancing the cleaning performance of detergent solutions by adding to such solutions the claimed combination of enzyme and oxidizing agent, particularly in use against starchy soils or stains. (Claims 20, 21; spec. at page 2, line 33 to page 3, line 13).

#### VI. Issues

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*Bacillus amyloliquefaciens* from among the hundreds of  $\alpha$ -amylases of various natural and synthetic origins disclosed in the art. Applicants contend in this appeal that the Examiner has failed to establish even *prima facie* obviousness of applicants' claims, and that even if the claims are *prima facie* obvious, they are not ultimately obvious in view of unexpected performance demonstrated in their application.

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of the reference. Applicants' claims very specifically call for a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens*. The reference does disclose an amylase such as applicants claim, among a far broader disclosure of any and all amylases of fungal or bacterial origin within the class EC 3.2.1.1, which encompasses literally hundreds of  $\alpha$ -amylases. As to the specific origin of amylases suitable for use within the scope of its teachings, Herbots is indifferent.

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On the other hand, applicants very specifically call for a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens*. Even in its most preferred embodiments, Herbots does not distinguish between BAN<sup>®</sup> and the other  $\alpha$ -amylases not recited by applicants' claims. One of ordinary skill in the art would have found no guidance in Herbots to select this specific amylase from the myriad amylases disclosed to combine with the recited peroxidic oxidizing agent.

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Herbots is equally wanting in disclosing any preference for the claimed enzyme, rejection of the claims for obviousness over this reference should not be maintained.

The Examiner has stated that it would have been obvious "to select any of the species of the amylase genus taught by the reference, including  $\alpha$ -amylase of the claims, because an ordinary artisan would have the reasonable expectation that any of the species of the genus would have similar properties and thus, the same use as the genus as a whole." Whether one of skill would have expected the claimed enzyme to work is not germane where there was no motivation to select it in the first place. Moreover, the Examiner's statement about expectations is wholly unsupported by any evidence from the art. On the other hand, there are teachings in the art that would have led one of skill to conclude that combining  $\alpha$ -amylases with the recited peroxidic oxidizing agents would not have been successful.

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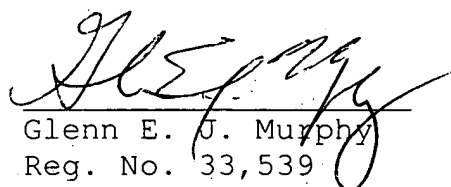
Moreover, any *prima facie* obviousness of the claims is overcome by the comparative testing presented in applicants' examples 1 and 2. Detergent compositions according to the invention comprising a naturally occurring  $\alpha$ -amylase derived from *Bacillus amyloliquefaciens* were compared to detergent compositions comprising several well-known amylases of natural and synthetic (genetically modified) origin. Indeed, applicants tested inventive compositions against compositions comprising some of the very enzymes that Herbots in its examples saw no reason to specify, including Termamyl® 60T, a naturally occurring amylase derived from *Bacillus lentus*, Duramyl® and PurafectOxAm®, genetically modified amylases, and Fungamyl®, an amylase of fungal origin. In applicants' tests, detergent compositions comprising the naturally occurring  $\alpha$ -amylase derived from *B. amyloliquefaciens* clearly outperformed otherwise identical detergent compositions containing these other  $\alpha$ -amylases. Thus, any

*prima facie* obviousness based on Herbots is rebutted by applicants' evidence of unexpected and superior cleaning performance according to the invention.

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APPENDIX

1. A detergent comprising
  - a) a naturally occurring  $\alpha$ -amylase from *Bacillus amyloliquefaciens*; and
  - b) at least one alkali metal percarbonate.
12. The detergent of claim 1, wherein the  $\alpha$ -amylase is present in an amount of from 0.001 to 0.5 mg per gram of the detergent.
13. The detergent of claim 1, wherein the at least one alkali metal carbonate is present in an amount of up to 50 percent by weight.
14. The detergent of claim 1, wherein the detergent contains 0.5 to 10 percent by weight of at least one compound which gives off peroxycarboxylic acid under perhydrolysis conditions.
15. The detergent of claim 1, wherein the detergent contains up to one percent by weight of at least one bleach boosting substance selected from group consisting of transition metal salts and transition metal complexes.
16. The detergent of claim 1, wherein the at least one alkali metal percarbonate comprises sodium percarbonate.



17. The detergent of claim 1, wherein the at least one alkali metal percarbonate is present in the form of granules.

18. The detergent of claim 1, wherein the at least one alkali metal percarbonate has a morphology index of below 0.06.

20. A method of increasing the cleaning performance of a detergent in washing and cleaning solutions, the method comprising the step of adding:

- a)  $\alpha$ -amylase from *Bacillus amyloliquefaciens*; and
  - b) at least one alkali metal percarbonate,
- to said detergent.

21. The method of claim 20, wherein the performance is increased against starchy and/or colored stains.